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Seeking to improve care for young patients: Development of tools to support the implementation of the CDC Pediatric mTBI Guideline★

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Abstract

Introduction: The Centers for Disease Control and Prevention (CDC) Pediatric Mild Traumatic Brain Injury (mTBI) Guideline was created to help standardize diagnosis, prognosis, and management and treatment of pediatric mTBI. This paper describes the process CDC used to develop educational tools, and a dissemination and implementation strategy, in support of the CDC Pediatric mTBI Guideline.

Methods: Two qualitative data collection projects with healthcare providers who care for pediatric patients were conducted. In-depth interviews were used in both projects. Project One examined healthcare providers' guideline use and dissemination preferences. Project Two assessed perceptions of the CDC Pediatric mTBI Guideline educational tools.

Results: Project One brought to light four key areas related to Guideline usage and dissemination preferences, specifically a need for: (1) partnership with professional medical societies; (2) integration into electronic health records, mobile apps, and websites; (3) development of continuing medical education (CME) opportunities; and (4) dissemination through healthcare system leadership. In Project Two, healthcare providers reported that the CDC Pediatric mTBI Guideline educational tools were well-organized, clear and easy to navigate, and informative. Healthcare providers also requested more information on the Guideline methodology.

Discussion: Assessment of pediatric healthcare providers' current use of clinical guidelines and preferences for educational tools yielded important insights that helped inform CDC's dissemination and implementation strategy for the Pediatric mTBI Guideline.

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Disclaimer

The findings and conclusions in this report are those of the author(s) and do not necessarily represent the official position of the Centers for Disease Control and Prevention.

Practical applications: The findings from these data collection projects can also inform other guideline implementation and dissemination efforts among healthcare providers.

Keywords

Concussion; Traumatic brain injury; Children; Guideline; Health care provider

1. Introduction

Mild traumatic Brain Injury (mTBI) is a commonly reported injury among children. Caused by a blunt force or direct blow to the head or body, an mTBI leads to a complex pathophysiological cascade involving ionic and neurometabolic changes and microstructural axonal dysfunction (Blennow, Brody, Kochanek, et al., 2016; McAllister, Sparling, Flashman, and Saykin, 2001; Giza & Hovda, 2014). These changes in the brain often lead to somatic, cognitive, behavioral, and sleep-related symptoms (CDC, 2017a). This injury is of particular concern for children due to their developing brain and their increased susceptibility to chemical and metabolic changes that occur in the brain when an mTBI occurs (Daneshvar et al., 2011; Giza & Hovda, 2014). Among children, most mTBI symptoms resolve within a couple of weeks, but the length of recovery varies based on the characteristics of the injury and person (Heyer, Weber, Rose, Perkins, & Schmittauer, 2015).

Clinical guidance for healthcare providers on diagnosis and management of pediatric mTBI is critical to improving the health and safety of this vulnerable population. Thus, in 2018, CDC published the *CDC Guideline on the Diagnosis and Management of Mild Traumatic Brain Injury Among Children* (CDC Pediatric mTBI Guideline; Lumba-Brown et al., 2018). Developed through a rigorous evidence-based process, the goal of the CDC Pediatric mTBI Guideline is to help standardize diagnosis, prognosis, and management and treatment of pediatric mTBI and facilitate a paradigm shift from consensus to evidence-based practices.

To help healthcare providers integrate the Guideline into their practices, CDC sought to create a comprehensive dissemination and implementation strategy, as well as educational tools for healthcare provider, patients, and families. To inform this effort, CDC conducted two qualitative data collection projects with healthcare providers who care for pediatric patients. The purpose of this paper is to describe the process CDC used and the findings from these efforts. The findings from these projects, and the process used by CDC, can also inform other guideline implementation and dissemination efforts aimed at healthcare providers.

2. Materials and Methods

The design for both data collection projects included in-depth interviews with healthcare providers who care for pediatric patients (i.e., healthcare providers who care for pediatric patients at least 25% of time). A total of 18 healthcare providers were interviewed, including 9 healthcare providers in Project One and 9 in Project Two.

Project One involved the examination of healthcare providers' experience and use of educational tools and guidelines. This project was designed to yield insights into strategies for dissemination and implementation of clinical guidelines.

Using findings from Project One as a foundation, CDC created educational tools to support implementation of the CDC Pediatric mTBI Guideline. These tools include tailored information for healthcare providers (such as at-a-glance fact sheets that highlight clinical recommendations on diagnosis, prognosis, and management/treatment and a letter for healthcare providers to give to schools) and for patients and their families (such as discharge instructions and a recovery tips handout; Fig. 1). To develop these tools, CDC used best practices in health communication and sought to create well-designed and user-tailored tools that focus on ease of use to aid in the uptake and understanding of the key clinical recommendations in the Guideline (Grol, 2001; Grol & Grimshaw, 2003; Francke, Smit, Veer, and Mistiaen, 2008).

During Project Two, the authors assessed healthcare providers' feedback (such as on the content, design, and usefulness) on the suite of educational tools. Project Two was initiated approximately 6 months after completion of Project One. Separate and unique interview guides were developed for each project. There was no overlap in the type of questions and content covered between the two projects.

Both projects shared parallel data collection environments, recruitment criteria, incentives, data collection and storage processes, and data analysis. The sole distinction with the data collection environment relates to the use of a screen-sharing platform in Project Two, as described below. Both Project One and Project Two were reviewed and approved by ICF's Institutional Review Board.

2.1. Data collection environment

To allow for greater flexibility with scheduling and to remove barriers related to time needed for transportation among busy healthcare providers, participants dialed into a toll-free conference line to join the interview. A trained moderator conducted the interview, which lasted no longer than 60 min. One to two authors silently observed the interview to take notes. Interviews were also audio recorded to support notetaking.

Prior to joining the interview, all participants signed a written informed consent form that described the project including the purpose of the project, known risks of participation, and other expectations for the data collection environment. The moderator reviewed the consent form at the beginning of the interview before asking any other questions. In addition to joining the toll-free conference line, participants in Project Two joined a screen-sharing platform that enabled them to review and provide feedback on the suite of educational tools for the CDC Pediatric mTBI Guideline outlined in Fig. 1.

2.2. Recruitment criteria

A professional recruitment company recruited participants for the data collection projects. A screener was used to recruit participants and to determine if they qualified to participate.

Recruitment criteria were the same for both projects and included participants who care for pediatric patients and represent a:

1. Variety of provider types: medical doctors, doctors of osteopathic medicine, nurse practitioners, and physician assistants.
2. Range of practice settings, including primary care, outpatient specialty, inpatient, and emergency care settings.
3. Mix of providers with and without access to concussion specialists.
4. Mix of both male and female healthcare providers.
5. Diversity of ethnic backgrounds.
6. Mix of geographic settings, specifically rural and urban settings.

2.3. Incentive

Participants were offered a \$200 stipend in the form of an Amazon gift card as an incentive for their time. Participants were required to complete the interview in order to receive the incentive and were emailed the incentive within 24 h of completing the interview.

2.4. Data analysis

Two authors independently reviewed notes from each of the interviews and then generated a list of emerging themes and subthemes based on categories of the moderator's guide as well as trends that emerged across discussions. This qualitative thematic approach allowed each author to review and analyze data separately to ensure that the findings were consistent. Next, the authors developed a combined list of themes and subthemes to code the interview notes based on both reviewers' input. Each author then coded the notes independently according to the agreed-upon themes, using a spreadsheet to record findings and quotes that fell into each subtheme. Then, the two authors discussed and resolved any discrepancies in the coding of the quotes. No coding software was used in the analysis. Below are the themes and subthemes used to code notes for each component:

Project One:

1. Experience Treating Pediatric mTBI
 - a. Challenges Diagnosing mTBI
 - b. Challenges Managing mTBI
2. Experience with mTBI Educational Tools and Guidelines
 - a. Preferences for Educational Tools
 - b. Using Guidelines
 - c. Barriers to Guideline Use
3. Insights into Guideline Dissemination and Implementation Strategies
 - a. Distribute Through Medical and Healthcare Organizations

- b. Conduct Outreach to Key Decision-makers
- c. Create Actionable Steps for Healthcare Providers

Project Two:

1. Review of the CDC Pediatric mTBI Guideline Educational Tools
 - a. Considerations on Content
 - b. Preferred Format
 - c. Feedback on Design

3. Results

Table 1 shows the diversity of participants included in both Projects One and Two based on six of the main criteria for recruitment.

3.1. Project One:

Results are reported according to the three overarching categories recorded in the methodology section. Throughout Project One, healthcare providers described three main themes: (1) Experience with diagnosis and management of patients with mTBI; (2) The role educational tools and guidelines play in their care practices; (3) Insights into effective strategies to promote broad dissemination and implementation of clinical guidelines.

3.1.1. Experience with Pediatric mTBI—Healthcare providers across the interviews describe having frequent exposure to patients with mTBI—with most reporting they often or daily see pediatric patients with this injury. When describing their experience with caring for patients, healthcare providers outlined several barriers and challenges related to diagnosis and management of mTBI.

3.1.1.1. Challenges with mTBI diagnosis.: Overall, healthcare providers in this data collection project reported that while they feel confident in their ability to diagnosis mTBI, ruling out more serious injury, such as a subdural hematoma, is a major concern. One emergency department pediatrician summed this up by stating, “being safely comfortable that there’s nothing more than an mTBI is my main focus.” To help identify patients at risk for more serious injury, healthcare providers reported challenges related to obtaining a clear medical history for the patient, such as whether the patient had a history of previous brain injuries. Multiple healthcare providers in the project, across all practice settings, explained that piecing together a child’s history surrounding an injury is a challenge, especially because the history is based on patients’ and their parents’ reporting. This is especially difficult “when the child is too young to describe how they feel.”

Among both emergency and primary care providers in the data collection project, decision-making about imaging was mentioned. Healthcare providers described pressure from parents to do further testing. An emergency department pediatrician described, “You need to reassure the family that they don’t need imaging,” and an emergency department physician

assistant said she had “heard from many other emergency department providers that [imaging] is an issue. We let them know our findings for risk.”

Finally, limited resources were discussed by two providers as factors that inhibit diagnosis of pediatric patients with mTBI. An emergency department physician assistant said that decisions regarding admitting or observing a child with mTBI to ensure they do not have a more serious injury can be difficult, because they “don’t have access to in-patient pediatrics.” One family doctor from a rural setting also mentioned that access to care and insurance issues are a challenge when diagnosing, since some elements of care may not be covered.

3.1.1.2. Challenges with mTBI management.: Healthcare providers in emergency settings found following up with pediatric mTBI patients as a significant challenge. One emergency department physician assistant mentioned that “you can’t do much follow-up in the emergency department. You have to trust they’ll show back up if they need to be re-evaluated. All we can really do is document that the parents agreed that they will return to the emergency department or primary care provider to be re-evaluated.”

Healthcare providers in primary care settings reported that they sometimes face challenges in determining next steps while managing a concussion—such as supporting the return to sports process. One provider discussed how he gets “pushback” from parents, who might say: “I spent \$7,000 for this league, why can’t you just clear him for play?” She mentioned that “kids feel that pressure to hide their symptoms, just to go back to play.” Another pediatrician from a rural setting mentioned that “if I feel like the injury isn’t serious I will let them return to play, but I’m a little more lax than most physicians.” One pediatrician mentioned that some “coaches have been reluctant to let their great athletes go to be evaluated because they don’t want to lose their star player.” Another pediatrician said that many times “I have to convince the parent that their child can’t return to sports when they’ve had a concussion. I get pushed by parents who want their kids to play.”

3.1.2. Use of educational tools and guidelines—The majority of healthcare providers in Project One reported using educational tools (such as electronic health records (EHR) and patient handouts), and guidelines to support and inform their care practices.

3.1.2.1. Preferred educational tools.: Among emergency care providers the most commonly used educational tool discussed was electronic health record (EHR) systems. A physician assistant shared, “when an EHR has check boxes, that’s the best. You click on pertinent negatives and positives, and you know you’ve gone through each key point.” In most cases, emergency care providers used an EHR to generate discharge instructions to send home with patients and their families. One emergency department physician described the benefit of being able to “generate discharge instructions that outline standards of care” and that he “appreciates the accessibility of the materials.” Another emergency care provider remarked, “Parents like [discharge instructions] because they don’t absorb everything we tell them, so they like having something to read.”

Primary care providers described trainings, conferences, and outreach to specialists and local hospitals as their own “go-to” for education and guidance. In addition, one primary care pediatrician shared that she “was trained to use the SCAT [Sports Concussion Assessment Tool—a standardized tool for evaluating athletes for concussion]. I like that it’s quantitative and you can measure the patient’s symptoms when they come back. It’s also a neurocognitive exam.”

3.1.2.2. Guideline usage: All healthcare providers in Project One reported using clinical guidelines in their daily practice. In some situations, they described looking up guidelines for reference, and in other situations participants stated that they implement guidelines “on the fly” or “by memory.” When asked which mTBI guidelines in particular, the PECARN decision rule was the most commonly named tool by the healthcare providers (Kuppermann, Holmes, Dayan, et al., 2009). This decision rule is used to help healthcare providers identify patients at risk for intracranial injury and determine when a pediatric patient should undergo a CT scan. A nurse practitioner in the emergency care setting shared, referring to other healthcare providers, “The first question every provider asks me is, ‘what is their PECARN score?’ It is used as a gold standard. I know that if I don’t use it, other healthcare providers will ask why.”

3.1.2.3. Factors that effect guideline usage: Overall, healthcare providers interviewed for this project reported that they choose to use guidelines that have clear action steps and recommendations that lead to a decision. One emergency department physician summed it up by stating the “need to have criteria lead you to steps to take that are not vague. If there are too many steps or it’s too complex, it looks like a roadmap with buried treasure somewhere, and that’s not helpful.”

Healthcare providers also consistently expressed the importance of credibility for a guideline. Often, a guideline was described as credible when, “evidence behind guidelines is based on the most current science” or is considered the “national standard” and/or “endorsed by professional medical associations.”

Still, several healthcare providers noted that even among clinical guidelines viewed as credible, “You have to treat patients individually, even if you have a clinical guideline.” This was especially true among healthcare providers with more years practicing. One physician assistant shared, “Since I’ve been practicing for 10 years, if I feel like the child hasn’t met any criteria in the guideline, but I myself think they do have something significant, I’ll surpass the guideline on gut feeling because you know what normal looks like.” Similarly, a pediatrician with many years in practice remarked, “I look at guidelines and have adapted and developed my own based on experience and what works, and tailor it to the patient.”

3.1.3. Insights into guideline dissemination and implementation strategies— Many healthcare providers remarked that getting guidelines implemented is a challenging process and often takes a long time. Barriers to guideline implementation centered on time-constraints often faced by healthcare providers. One participant captured this concern by commenting “we don’t have time because we have to see a patient every 20 minutes, that’s a huge barrier, and every time we add a guideline or formalize [a process], we have more

buttons to click, more questions to ask, more things to do, time is a huge barrier.” Despite these challenges, healthcare providers reported that they were eager to hear about new guidelines, especially those that include practice-changing recommendations.

Additionally, healthcare providers across the interviews had several recommendations for strategic ways to develop and implement clinical guidelines. These recommendations focused on: (a) Distribution through medical organizations; (b) Outreach to key decision-makers; and (c) Creation of actionable steps for healthcare providers.

3.1.3.1. Distribution through medical and healthcare organizations.: Many healthcare providers in Project One described that they learn about clinical guidelines through medical journals, professional medical organizations, information from their hospital or administration, or continuing medical education (CME) and conferences. They also described that they review published literature and seek out information sources that are easy and quick to access while they are at work. One provider in a hospital setting said, “I read everything sent from the hospital or my physician group about clinical guidelines.” Another provider who worked in a hospital said “our hospital is keeping us informed through mass send-outs to physicians and local staff.”

To create awareness, many healthcare providers suggested also using CME opportunities, conferences, and email communication to spread the word about guidelines, especially if the email comes from the CDC or the professional organization they belong to, and indicated that a new guideline had been released. One provider also said “If I knew the guideline has been published, I’d read it. A physician’s specialty organization should let them know they’re available and have them published through that organization’s journal.”

3.1.3.2. Conducting outreach to key decision-makers.: Involvement of leadership or key decision-makers in a healthcare provider’s practice setting was a common theme among the participants. Healthcare providers emphasized that, “it is important to get leadership on board because their buy-in is often essential to implementation” and “hospital administration is responsible for putting the guideline in the EHR.” Other healthcare providers also mentioned that having “someone come to a staff meeting for 15–20 minutes” could help “you know everyone is on the same page,” especially because it is a time when busy healthcare providers are already available.

3.1.3.3. Creating actionable steps for healthcare providers.: Several healthcare providers in the project shared that guidelines without clear steps can be hard to implement. One healthcare provider put it this way: “the main thing that makes it hard is if it’s really complicated and you always have to go back to the paper with the guideline to remember if you’ve covered it.” Similarly, healthcare providers noted, “if there’s no action behind recommendations, it’s not very useful” and “I won’t use it if I have to refer back or if there are inconsistencies.”

3.2. Project Two

In Project Two, participants provided feedback on CDC’s Pediatric mTBI Guideline educational tools, including: at-a-glance summaries of the Guideline, discharge instructions,

recovery tips handout, and a return to school letter. Feedback on the educational tools centered on presentation of the content in the materials, as well as their preferred format and design elements contained in the materials.

3.2.1. Review of the CDC pediatric mTBI guideline educational tools

3.2.1.1. Considerations on content.: Several healthcare providers emphasized the need for the guideline methodology to be transparent and detailed across the materials. After reviewing the materials for healthcare providers, one nurse practitioner shared, “I’m wondering what the process was like. How was the guideline put together? Did they do a systematic analysis? Add more info about methodology to make sure it’s validated.” Others commented “I would want locations on where to see the research studies” and “I think I was a little skeptical at first because I wasn’t sure where [the guideline materials] came from.” Healthcare providers recommended providing background on the guideline development process in order to demonstrate the evidence-base and methodology and to distinguish these tools from promotional items they receive.

All healthcare providers in Project Two valued the communication tools they can use with families, both during the patient visit and that families can take home and use as a resource. Several healthcare providers noted that materials that list common concussion symptoms for parents to reference at home is helpful following their visit. One pediatrician shared that, “Parents get anxious when they don’t know how their child will act, so having the symptoms delineated is helpful and tips are helpful.”

Of the materials they reviewed, healthcare providers were most enthusiastic about the return to school letter, a resource that they can give parents with guidance for return to school. Overall, healthcare providers were eager to use this new resource since it fills a gap in their available tools. A pediatrician recommended that materials should address how long a young athlete with an mTBI should expect to be away from play, since this is usually athletes’ top concern after this injury. One pediatrician shared, “I usually have to make up my own version of this so it’s helpful that [CDC’s letter] is created already.”

3.2.1.2. Preferred format.: All healthcare providers in the project, in both emergency department and primary care settings, emphasized that shorter resources are best for communicating with patients. They also preferred materials that use clear and simple language with brief paragraphs and bulleted key information. As one provider noted: “You need to be very precise about what you want them to see and know without overloading them.” Several healthcare providers suggested providing materials for patients and their parents in a mobile accessible format, particularly videos. “If I texted them a link about what their child has, they could go home and watch.”

In regard to the materials created for healthcare providers, participants preferred digital or web-based formats. Examples included “fast access apps, especially calculators with scoring systems” and “having access through a web search.” Additionally, some healthcare providers noted that guidelines that are very easy to use in an EHR are especially helpful, noting that “you end up not wanting to use [a guideline] if it’s really complex because you can’t document you used it correctly.”

3.2.1.3. Feedback on design.: For materials for patients and families, all healthcare providers in Project Two believed that design elements, including photography, bullets, and color, improved the accessibility of the information and is more engaging than other resources that are available as take home materials for families. Healthcare providers liked that the images in the CDC materials as they did not include “scary imagery” or “photos that might make parents worried,” such as those that show blood or a seriously injured child.

There was mixed feedback on the level of design in the materials created for use for healthcare providers. Some appreciated the graphic elements and how they bring attention to certain sections and help make the information easier to read. Conversely, others were indifferent to the design and said they’d read the materials regardless of whether they were designed pieces. One nurse practitioner shared, “Graphics are really not something that matters to a provider looking for information. You just need info, not pictures.” Similarly, a pediatrician noted, “the colors and fonts are fine and appealing, but I don’t care about that stuff much.” Some healthcare providers didn’t have access to color printers in their work settings and noted the importance of the colored versions printing clearly in black-and-white.

4. Discussion

Assessment of pediatric healthcare providers’ current use of clinical guidelines and preferences for educational tools yielded important insights that helped inform CDC’s dissemination and implementation strategy for the CDC Pediatric mTBI Guideline. Based on the feedback from Project One, CDC created a dissemination and implementation strategy that focused on four key areas. The first is to partner with professional medical organizations to ensure the Guideline is shared by organizations that are trusted information sources in the field. Second, CDC will explore opportunities to integrate the Guideline into EHR systems, mobile apps, and websites that are common reference tools among healthcare providers. Third, CDC will develop CME opportunities that will motivate and make it easier for healthcare providers to learn about the Guideline. Finally, CDC aims to disseminate the Guideline through healthcare system leadership (e.g., hospital administrators and practice managers) who have decision-making power around standards of care and EHR integration.

In Project Two, healthcare providers reviewed a suite of materials about the CDC Pediatric mTBI Guideline. Overall, healthcare providers reported that these materials were well-organized, clear and easy to navigate, and informative.

Participants also provided suggestions for changes to improve the materials. First, several healthcare providers recommended providing more detail about the guideline methodology, such as the number of studies reviewed, the inclusion and exclusion criteria, and the literature review process. They believed including this information would increase the credibility of the translation materials. Since healthcare providers reported a need for more information related to the Guideline methodology, CDC revised the materials to include information about how the Guideline was developed.

Some healthcare providers had a negative reaction to promotional language in the materials and noted that certain terms such as “evidence-based” needed to be substantiated with more detail as described above. In fact, some healthcare providers believed that promotional language made the materials seem less credible, and the healthcare providers less likely to read and use them. To address this, CDC edited the materials for tone and removed language that participants identified as marketing language. To ensure the materials were readable when printed in black and white, CDC also test-printed the documents to check image quality and dark–light contrast in the black and white versions.

The findings of these data collection projects are subject to several limitations. First, the size of the interview population is not large or diverse enough to allow the findings to be generalizable to the whole population of healthcare providers. Second, healthcare providers who participated in these projects practiced in different settings, some in hospitals and some in private or small group practices. They also practiced in both rural and urban settings. While the projects were inclusive of healthcare providers with varying work settings, we did not analyze the findings to identify differences by practice setting. A separate CDC project is planned to explore differences among healthcare providers’ caring for pediatric patients with mTBI who work in rural versus urban practice settings. Third, these projects assessed healthcare providers’ perceptions of materials designed to support communication with patients and their families. Follow-up assessments could involve interviewing patients and their families across diverse settings in order to evaluate the materials from these audiences’ perspectives. Finally, given the clinical importance of this topic and the possibility of social desirability bias, healthcare providers may have felt the need to answer questions about their care practices in a way they thought would be acceptable to the interviewer.

5. Conclusion

CDC used a qualitative approach to identify strategies to support healthcare providers across a range of practice settings to implement the CDC Pediatric mTBI Guideline. Healthcare providers provided valuable insights into opportunities to enhance the CDC Pediatric mTBI Guideline implementation strategy and educational tools. CDC applied these findings to update and build upon current implementation efforts. CDC will look for opportunities to continue to improve upon implementation efforts, such as through evaluation of the usage of the Guideline by healthcare providers.

5.1. Practical application

To make an impact, guidelines need to be implemented by healthcare providers on a broad scale. Best practices in health communication encourage user feedback to create well-designed and user-friendly tools to support uptake of clinical guidelines. (Grol, 2001; Grol & Grimshaw, 2003; Francke, Smit, Veer, and Mistiaen, 2008). The findings from these projects, and the process used by CDC, can be adapted to help inform other guideline implementation and dissemination efforts among healthcare providers.

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The figure displays eight educational tools from the CDC Pediatric mTBI Guideline:

- Diagnostic Recommendations:** Focuses on the goal of the guideline to help healthcare providers assess the health of their pediatric patients with mTBI. It includes a goal statement, a list of recommendations for diagnosis (e.g., hearing, neurophysiologic tests, brain imaging), and a CDC logo.
- Prognostic Recommendations:** Focuses on the goal of the guideline to help healthcare providers assess the health of their pediatric patients with mTBI. It includes a goal statement, a list of recommendations for prognosis (e.g., counseling patients on prognosis, evaluating for potential conditions), and a CDC logo.
- Management and Treatment Recommendations:** Focuses on the goal of the guideline to help healthcare providers assess the health of their pediatric patients with mTBI. It includes a goal statement, a list of recommendations for treatment (e.g., physical, cognitive, psychological), and a CDC logo.
- Caring for Your Child's Concussion:** Explains what a concussion is, how it will affect the child, and provides quick tips for recovery. It includes a CDC logo.
- How Can I Help My Child Recover After a Concussion?:** Provides quick tips for parents to help their child recover, such as ensuring the child avoids activities that could put them at risk of another injury. It includes a CDC logo.
- School Letter:** A template letter for school staff to inform them of a child's concussion and provide recommendations for return to school. It includes a CDC logo.

Fig. 1. CDC pediatric mTBI guideline educational tools.

Table 1

Participant demographics.

Project	Type	Setting	Access to Concussion Specialists	Gender	Race/Ethnicity	Geographic setting
One	• Medical doctor or doctor of osteopathy (6)	• Primary care (5)	• Yes (6)	• Male (4)	• Non-Hispanic White (4)	• Urban (5)
	• Nurse practitioner or physician assistant (3)	• Emergency room (4)	• No (3)	• Female (5)	• Hispanic, White (1) • Asian (2) • Black/African American (1) • Refused (1)	• Rural (4)
Two	• Medical doctor or doctor of osteopathy (4)	• Primary care (5)	• Yes (6)	• Male (4)	• Non-Hispanic, White (5)	• Urban (5)
	• Nurse practitioner or physician assistant (5)	• Emergency room (4)	• No (3)	• Female (5)	• Asian (2) • Black/African American (2)	• Rural (4)

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